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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

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TITLE OF THE INVENTION (280 characters max)

EDGE CONTROLLED AIRBAG FOLD AND METHOD

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ENCLOSED APPLICATION PARTS *(check all that apply)*

☒ Specification *Number of Pages* 3 ☐ CD(s), Number

☒ Drawing(s) *Number of Sheets* 6 ☐ Other (specify)

☐ Application Data Sheet. See 37 CFR 1.76

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Respectfully submitted,

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Date **2/23/04**

REGISTRATION NO. *(if appropriate)* **42,310**

Docket Number: **5703-00062**

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PROVISIONAL APPLICATION COVER SHEET
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Docket Number	5703-00062	Type a plus sign (+) inside this box →	+

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CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10) Applicant(s): Curtis Clarke et al.			Docket No. 5703-00062
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Invention: **EDGE CONTROLLED AIRBAG FOLD AND METHOD**

I hereby certify that the following correspondence:

Provisional Application (3 pages); Drawings (6 sheets); Check No. 18786 for $160.00; Postcard

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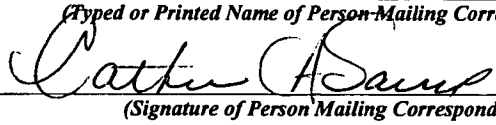

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EDGE CONTROLLED AIRBAG FOLD AND METHOD

DETAILED DESCRIPTION

Referring to Figure 1, there is shown an airbag folding apparatus 10 in accordance with a preferred constructed embodiment of the present invention. Apparatus 10 preferably includes a platen 12 and a plurality of folding blocks 14a-b and 16a-b. In a preferred embodiment, apparatus 10 is operated by placing an airbag such as a substantially circular airbag 20 on platen 12 and folding it by drawing blocks 14a-b and 16a-b inwardly, compressing airbag 20 between the blocks and forming the same into a relatively compact shape for positioning in an airbag housing (not shown). Referring also to Figure 2, there is shown airbag 20 partially compressed/folded between blocks 14a and 14b. It should be appreciated that although a circular airbag is shown other airbag designs may be useful with the present invention. All the component parts of the present invention may be manufactured from known materials and by known processes.

In a preferred embodiment, each of blocks 14a and 14b are equipped with slidable blades or retaining tabs 22a and 22b that assist in holding airbag 20 against platen 12 during a folding operation. As blocks 14a-b and 16a-b are drawn inwardly, for example with a pneumatic or hydraulic actuator retaining tabs 22a and 22b preferably prevent or minimize the tendency for airbag 20 to bunch upwardly away from platen 12. This retention prevents airbag 20 from folding inwardly such that a periphery of the airbag is captured within the folds. An upper retaining plate 30, illustrated in Figure 2 may be employed to enhance compression of airbag 20 by providing for a downward force against the compressing airbag.

A variety of constructions and features are contemplated for retaining tabs 22a and 22b. In one preferred embodiment, tabs 22a and 22b are reciprocable relative to their respective blocks 14a and 14b. Turning also to Figures 3a-b and 4a-b, there are shown blocks 14a and 14b with tabs 22a and 22b, respectively, slidably positioned therein. Each of tabs 22a and 22b are preferably equipped with an outer rail 24a-b and inner rail 26a-b (inner rail not illustrated in Figure 4(a)). The outer rails 24a-b are preferably positioned at an outer end of the tabs, and allow an operator or actuator to draw tabs 22a and 22b outwardly of blocks 14a and 14b. Upon compression/folding of airbag 20 to its desired state, rails 24a and 24b can be used to pull tabs 22a and 22b out of

engagement with airbag 20. In this manner, an airbag ejector (not shown) can be used to push the now folded airbag 20 up away from or off of platen 12, for positioning in a housing. Any of a variety of structural means can be used to ensure that tabs 22a and 22b are not pulled completely out of blocks 14a and 14b. For example, tabs 22a and 22b can be formed having a relatively small projection that engages with a complementary portion of the block and prevents complete disengagement therefrom. Inner rails 26a and 26b are preferably provided for positive positioning of tabs 22a and 22b when they are slid through blocks 14a and 14b and positioned above airbag 20. As illustrated in Figure 2, inner rails 26a and 26b are preferably positioned on tabs 22a and 22b such that they allow insertion of the tabs through the block only up to a desired point, or extent above airbag 20.

Although apparatus 10 is illustrated as having only two blocks (14a and 14b) equipped with tabs 22a and 22b, it should be appreciated that other embodiments are contemplated wherein all of the blocks or fewer of the blocks are provided with tabs. Moreover, all the tabs need not be reciprocable. Figure 8 illustrates an embodiment wherein a folding block 114 is equipped with a tab 122 rigidly affixed thereto. Figure 9 illustrates yet another embodiment wherein a set of folding blocks 116a, 116b and 116c is provided having angled engagement surfaces 119 and 121. In the Figure 9 embodiment, engagement surfaces 119 and 121 are positioned at an acute angle relative to the platen (not shown). Thus, during operation, the angled surfaces assist in preventing undesirable upward movement of the airbag during compression/folding.

Turning now to Figures 5-7, there are shown various views of a folding block 115 according to yet another embodiment of the present invention. Block 115 is preferably equipped with a retainer 222 that comprises an upwardly opening slot 223 adapted to receive an end of an airbag 220. Prior to a folding operation, the end of airbag 220 is placed in slot 223. As airbag 220 is compressed inwardly, the engagement of the end of airbag 220 in slot 223 prevents undesirable upward movement of a periphery of airbag 220 from a platen 212. Embodiments are contemplated wherein retainer 222 is made from a resilient material such that insertion of airbag 220 in channel 223 provides for a resilient clamping force on the airbag. Stated another way, retainer 222 may be formed from a springy or rubbery material such that when an edge of airbag 220 is

pushed into channel 223, it is retained therein. Figure 6a depicts an embodiment wherein a spring tab 222 is provided that clamps airbag 220 against block 215 with a spring force.

In a related embodiment, the present invention provides a method of folding or compressing an airbag. The method includes the step of placing an airbag 20 substantially flat upon a folding platen 12 between a plurality of blocks 14a-b and 16a-b, having means for retaining outer edges of the airbag 20. Next, the blocks are drawn inwardly about the airbag to effect a folding or compression thereof. When the airbag reaches the desired state, the edges are disengaged from the blocks, and an airbag ejector is actuated to push the folded airbag away from the platen and into an airbag housing.

The present invention offers numerous advantages over many known airbag folding designs. In particular, retention of the edge of the airbag during folding has been shown to reduce the likelihood of the perimeter of the airbag becoming trapped inside the folds, producing superior deployment characteristics in certain environments. Further, the overall consistency of the folding process in improved.

The present description is for illustrative purposes only, and should not be construed to narrow the breadth of the present invention in any way. Thus, those skilled in the art will appreciate that various modifications might be made to the presently disclosed embodiments without departing from the spirit and scope of the present invention.

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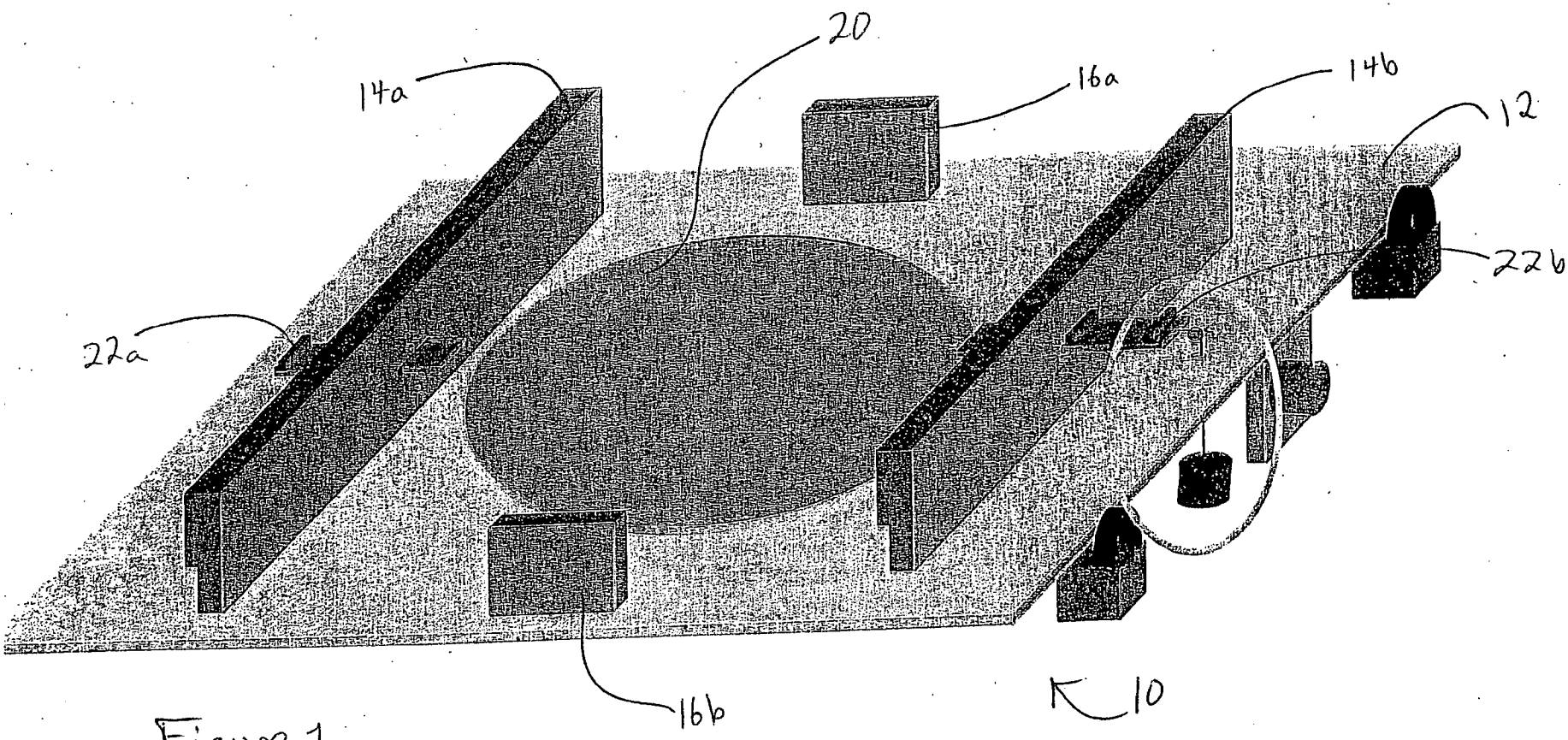


Figure 1

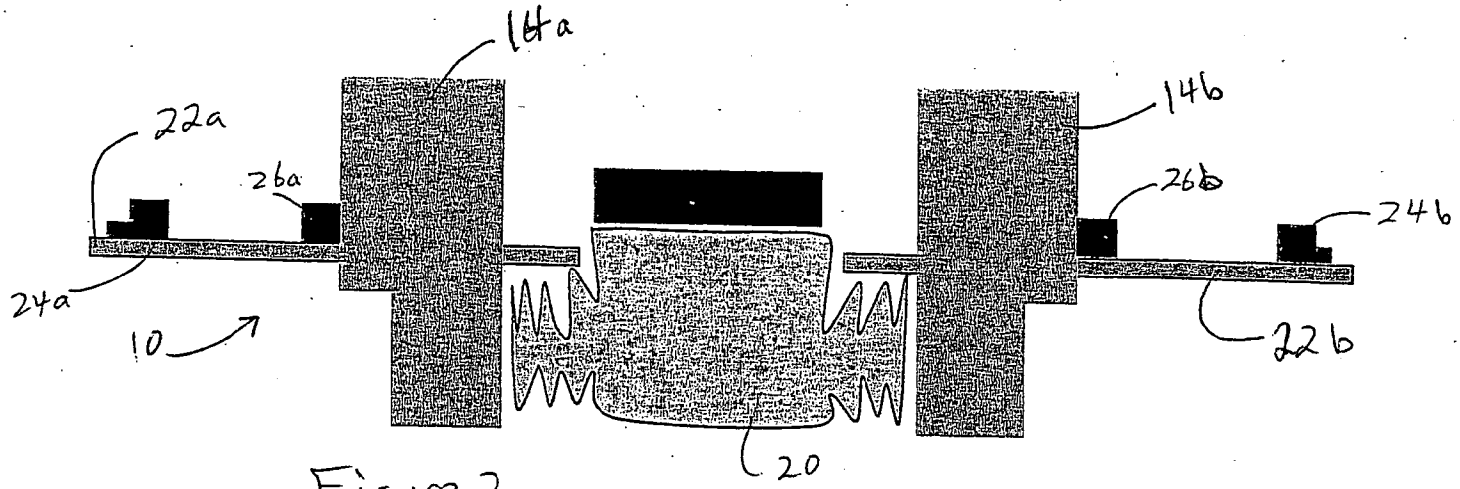


Figure 2

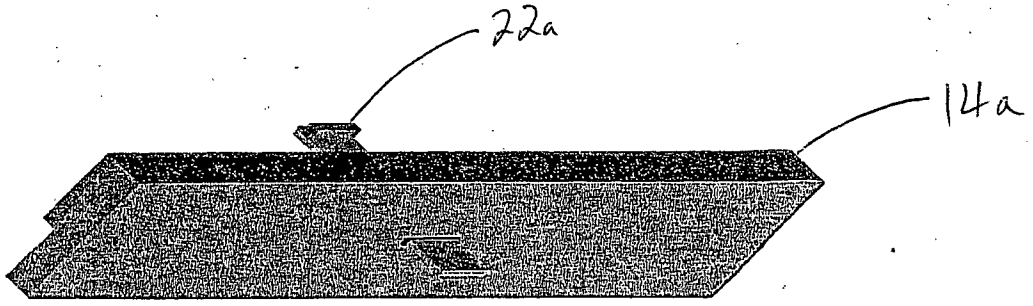
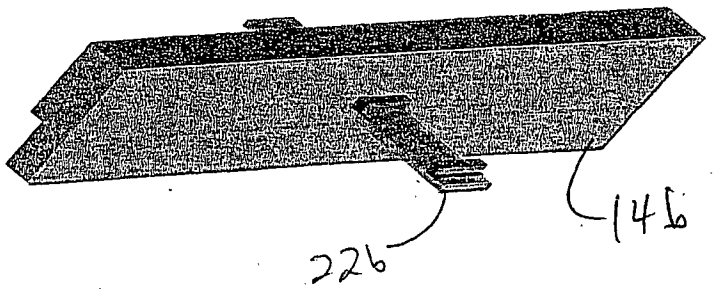


Figure 3(a)

Figure 3(b)



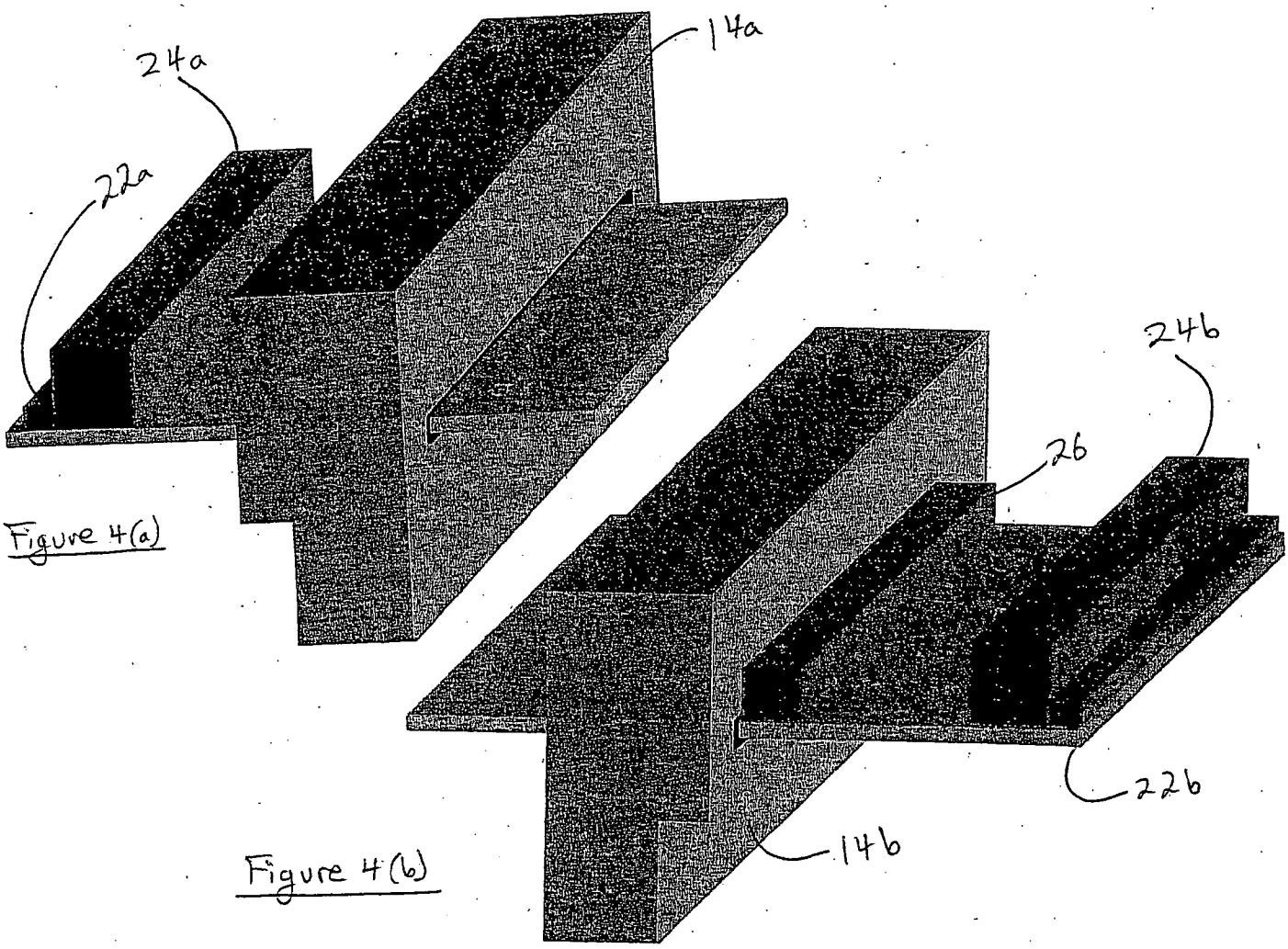


Figure 4(a)

Figure 4(b)

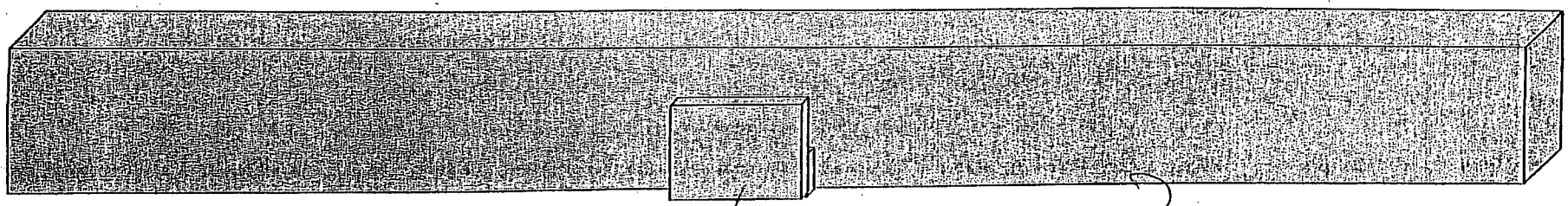


Figure 5

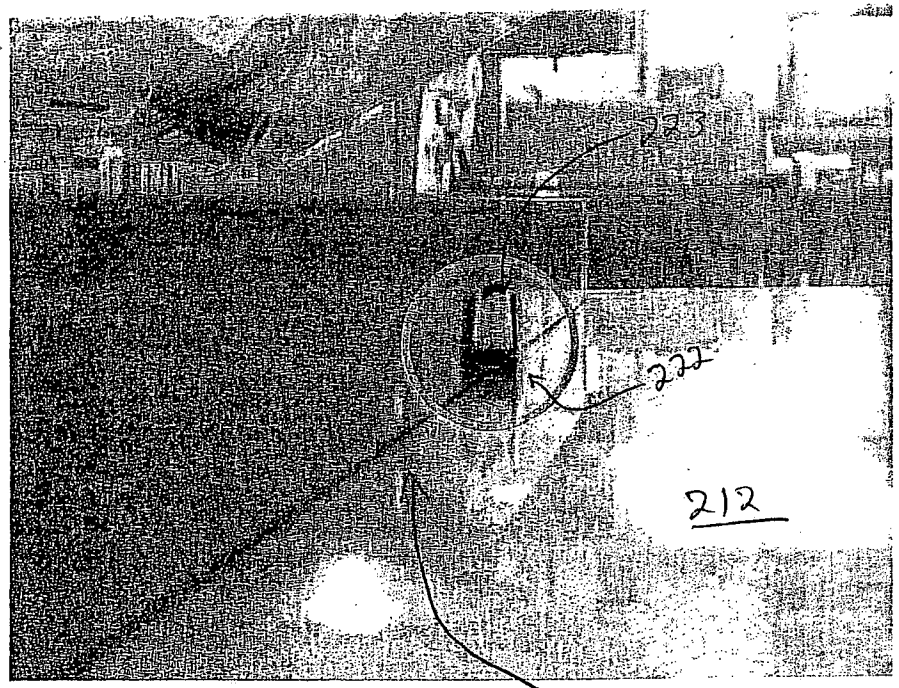


Figure 6

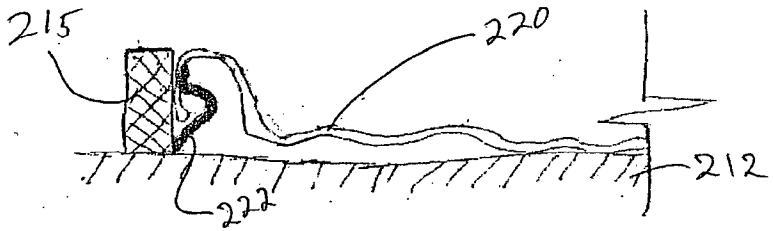


Figure 6a

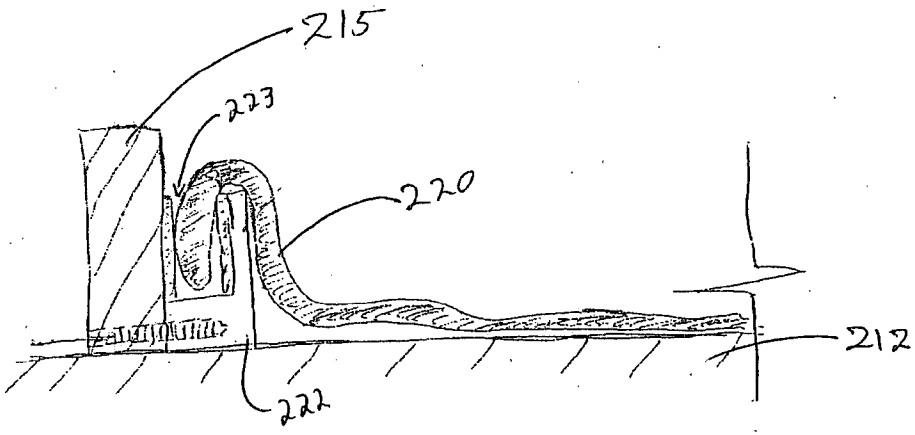
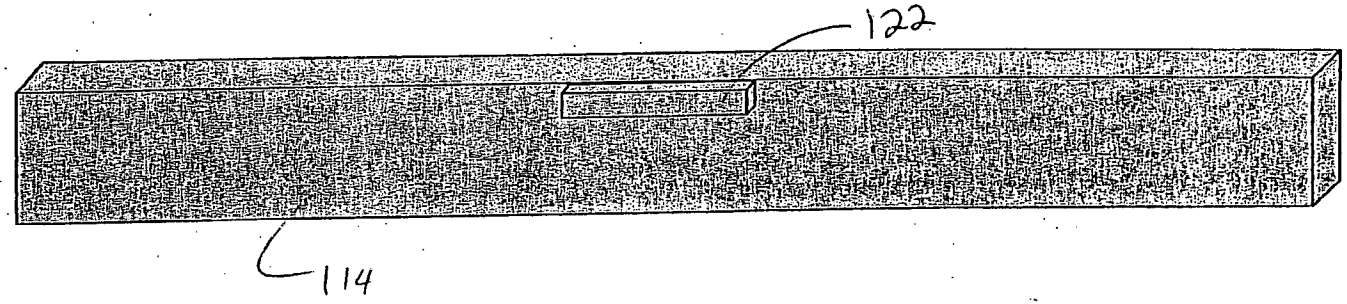


Figure 6b

Figure 8



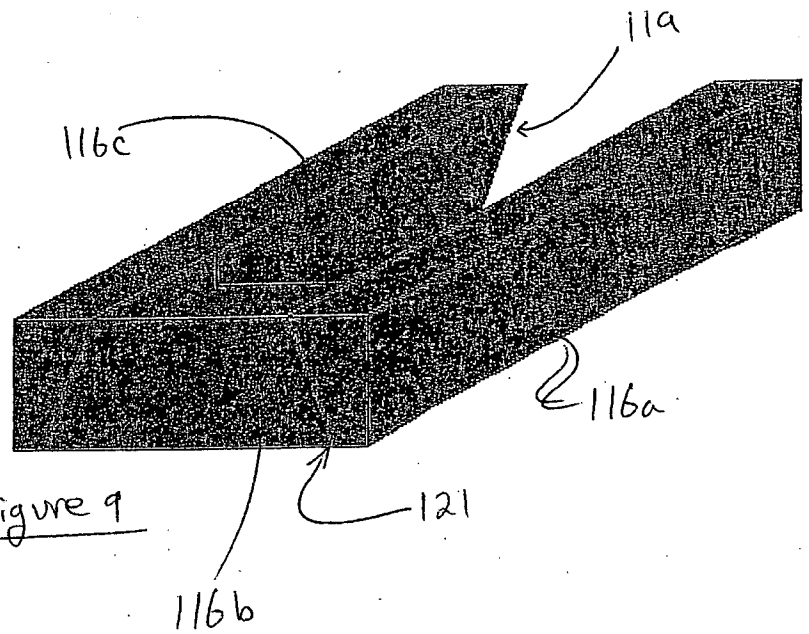


Figure 9